2-33A GROSS WEIGHT and BALANCE CALCULATIONS

When preparing for any particular flight the pilot must answer two questions:

1. Is my weight and my passenger's weight within the maximum limits of gross weight for this flight? and

2. Is the sailplane properly balanced for this flight?

The following procedure is designed to help the pilot determine the actual weight and balance of his 2-33A for any particular flight loading. To do this, we calculate the moments of the aircraft and each occupant using the equation weight X arm = moment (WA = M).

The sailplane must be balanced within forward and rearward C.G. limits when it is flown. Thse limits are defined at Sta. 78.20" for the forward limit, and Sta. 86.10" for the rear limit. This figure is constant for all 2-33's. The weight and empty center of gravity of each specific 2-33 is determined at manufacture, or on any subsequent reweighing, so this information is available to any pilot from Schweizer Form I-4427 to calculate his operational weight and balance. Also known are the arm (or distance aft of Station "0") for the optional ballast, the front pilot and the rear pilot. With this given information we can develop a form for calculating the actual arm (or C.G. location) for the sailplane for any particular loading.

Items Known:

Front Pilot Weight _____ Sta. 43.80

Rear Pilot Weight _____ Sta. 74.70

Sailplane Empty Weight _____ 2-33 S/N _____

Removable Ballast Weight - 0 or 26 lbs. (all 2-33's) Sta. 14.75

Baggage Capacity - None allowed

Sailplane Empty C.G. _____ 2-33 S/N _____

Limits: Forward: Sta. 78.20 (all 2-33's)

Rear: Sta. 86.10 (all 2-33's)

To Be Determined:

1. Whether the actual CG of the particular 2-33 to be flown will fall within the above limits.

2. Whether total gross weight is not greater than the maximum allowable 1,040 lbs. for any 2-33.

SCHWEIZER 2-33 & 2-33A PARTS and MAINTENANCE

WEIGHT AND BALANCE CALCULATIONS SGS 2-33 or 2-33A

Example Sailplane Serial No. 369 (See Form I-4427 below)

ITEM	WEIGHT	ARM	MOMENT
Sailplane empty weight & empty C.G.	612	96.12	58,825
Front Pilot Weight	170	43.80	7,446
Rear Pilot Weight	150	74.70	11,205
Ballast, if used	0	14.75	-0-
Total Moment			77,476
Total Weight	932		

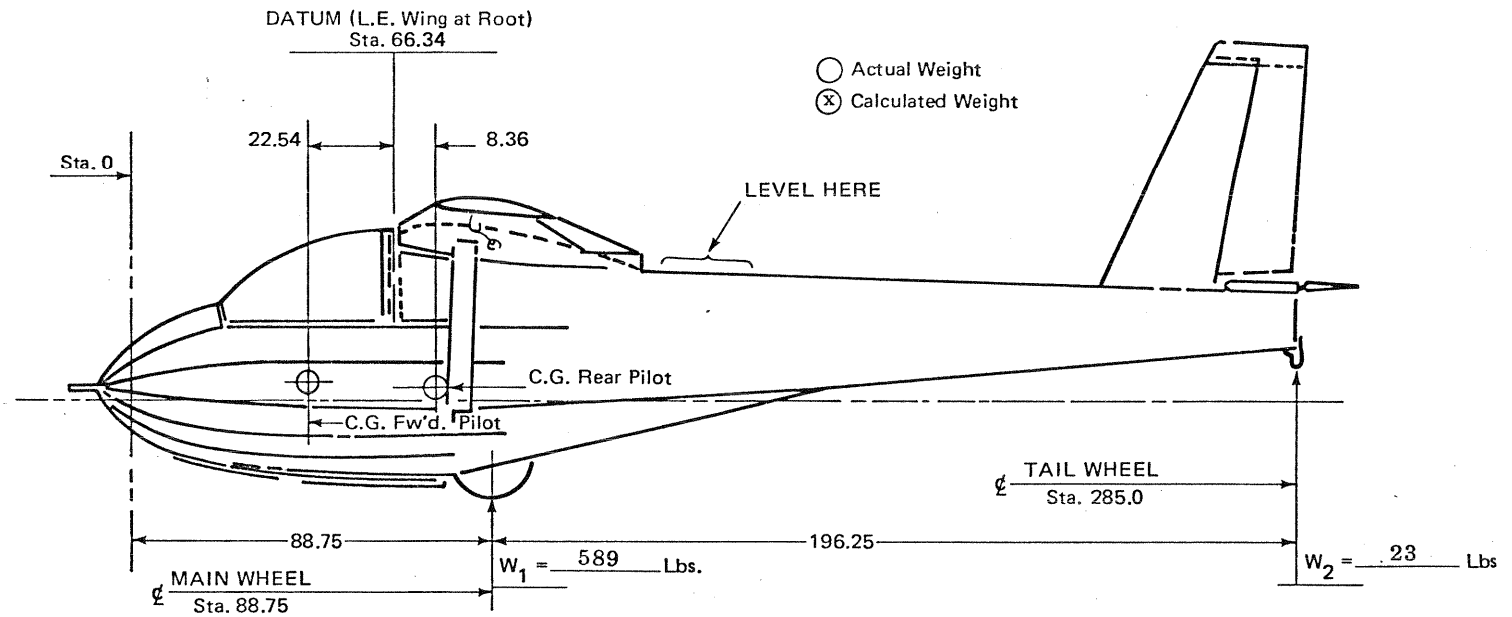
$$\frac{\text{Total Moment}}{\text{Total Weight}} = \frac{77,476}{932} = 83.12$$ Actual flying CG

This CG is between the limits of Sta. 78.20 and 86.10, and gross weight is less than 1,040 lbs., so this sailplane has a proper flight weight and balance loading.

SCHWEIZER AIRCRAFT CORPORATION
ELMIRA, NEW YORK 14902

Form I-4427-1

WEIGHT & BALANCE, MODEL NO. SGS 2-33A SER. NO. 369 REG. NO. N-33969 DATE February 27, 1975



Empty Wt. = $W_1 + W_2$ = 589 + 23 = 612 Lbs.

Empty C.G. (Sta.) = $\frac{W_2 \times 196.25 + 88.75}{W_1 + W_2}$ = $\frac{23 \times 196.25}{612} + 88.75$ = Sta. 96.12

SHIP AS WEIGHED INCLUDES EQUIPMENT LISTED ON I-4427-3
NOTES: See Glider Data Sheet No. G2EA - Fw'd Pilot C.G. at Sta. 43.80 - Rear Pilot C.G. at Sta. 74.70
CLASS II, UTILITY: C.G. Limits - Sta. 78.20 to Sta. 86.10, or, 11.86" to 19.76" Aft Datum.

SCHWEIZER 2-33 & 2-33A PARTS and MAINTENANCE

WEIGHT AND BALANCE CALCULATIONS SGS 2-33 or 2-33A

ITEM	WEIGHT	ARM	MOMENT
Sailplane empty weight & empty C.G.	_____	_____	_____
Front Pilot Weight	_____	43.80	_____
Rear Pilot Weight	_____	74.70	_____
Ballast, if used	_____	14.75	_____
Total Moment			_____
Total Weight	_____		

$\frac{\text{Total Moment}}{\text{Total Weight}}$ = $\frac{\text{Total Moment}}{\text{Total Weight}}$ = = Actual flying CG

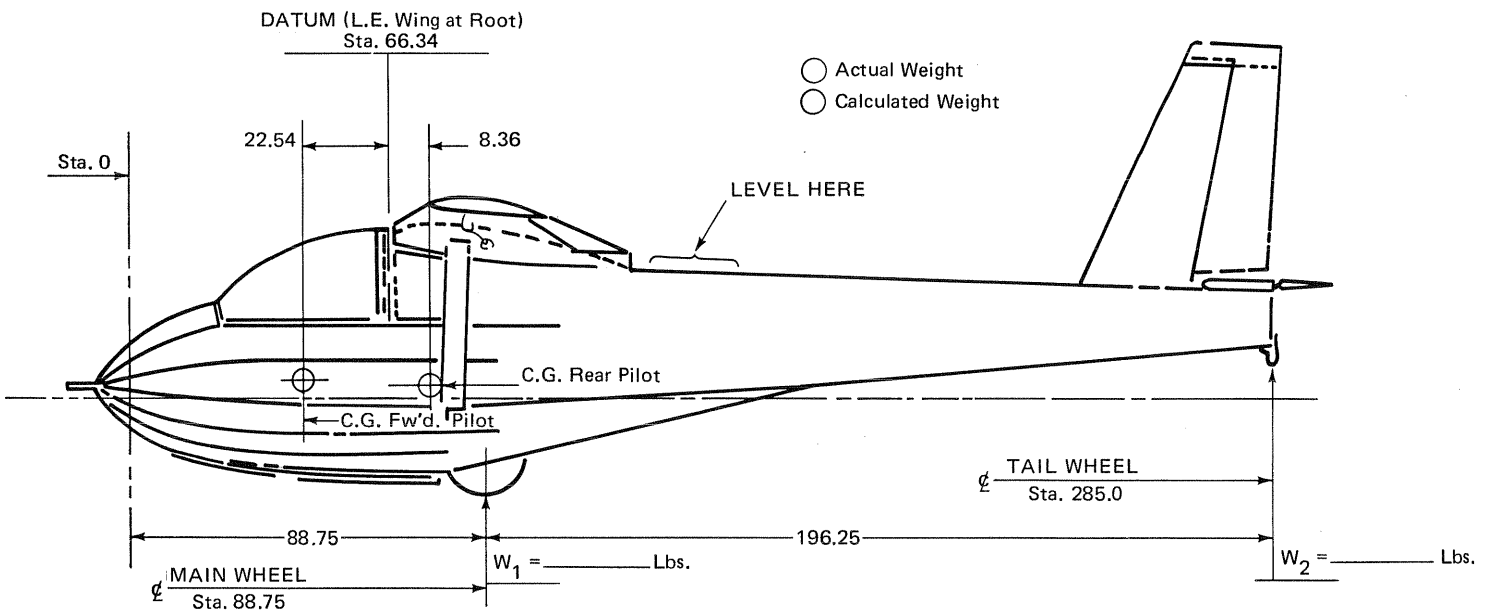
SERIAL NO. _____

1. Is this between the CG limits?
2. Is total weight less than 1,010 lbs.?

SCHWEIZER AIRCRAFT CORPORATION
ELMIRA, NEW YORK 14902

Form I-4427-1

WEIGHT & BALANCE, MODEL NO. SGS 2-33A SER. NO. _____ REG. NO. _____ DATE _____



Empty Wt. = $W_1 + W_2$ = _____ + _____ = _____ Lbs.

Empty C.G. (Sta.) = $\frac{W_2 \times 196.25 + 88.75}{W_1 + W_2}$ = _____ X 196.25 + 88.75 = Sta. _____

SHIP AS WEIGHED INCLUDES EQUIPMENT LISTED ON I-4427-3
NOTES: See Glider Data Sheet No. G2EA - Fw'd Pilot C.G. at Sta. 43.80 - Rear Pilot C.G. at Sta. 74.70
CLASS II, UTILITY: C.G. Limits - Sta. 78.20 to Sta. 86.10, or, 11.86" to 19.76" Aft Datum.

SCHWEIZER 2-33 & 2-33A PARTS and MAINTENANCE

WEIGHT & BALANCE MODEL SGS 2-33A

Ser. No.:_____ Reg. No.:_____

C. G. CONDITIONS – AFT LIMIT

MIN. WEIGHT PILOT SOLO (FRONT SEAT):

Min. Pilot Weight = $\frac{\text{Empty Wt. (C. G. Empty - 86.10)}}{42.30}$ = $\frac{(\quad - 86.10)}{42.30}$ = _____ lbs.

MIN. WEIGHT REAR PILOT (ASSUMING 100# FWD PILOT):

Min. Pilot Weight = $\frac{\text{Empty Weight (C. G. Empty - 86.10)}}{11.40}$ - 372 =

$\frac{(\quad - 86.10)}{11.40}$ - 372 = _____ lbs.

C. G. CONDITIONS – FORWARD LIMIT

MAX. WEIGHT REAR PILOT (ASSUMING 220# FWD. PILOT):

STEP #1: Max. Pilot Weight = Empty Weight (C. G. Empty - 78.20) - 2162 =

$\frac{(\quad -78.20)}{3.50}$ - 2162 = _____ lbs.

STEP #2: Max. Pilot Weight = *1040 - (Empty Weight + 220) =

1040 - (_____ + 220) = _____ lbs.

Use lower Weight from Step 1 or 2 for Max. Rear Pilot Weight.

* Maximum Gross Weight is 1040 LBS.

Prepared by: _____ checked by: _____

Date: _____ Date: _____

MODEL SGS 2-33A,____

Date:_____

SER. NO._____ REG. No._____

The Empty Weight as shown on I-4427-1 includes the following equipment:

ITEM NO.	EQUIPMENT INSTALLED	WEIGHT	STA.	MOMENT

NOTES